in BES among the various stents, showing a significant correlation with positive remodeling by intravascular ultrasound (r=0.42, p=0.047).
Conclusions: Differences in neointimal coverage as assessed by OCT in BMS, E-ZES, EES and BES were found after 9-month implantation in STEMI patients. This might cause differences in the development of stent thrombosis. Furthermore, E-ZES might have potential to lead to early discontinuation of dual antiplatelet therapy among these second-generation drug-eluting stents.

Table 1: Differences related to QCA and OCT findings after 9-months implantationamong BMS, E-ZES, EES and BES

	BMS	E-ZES	EES	BES
Restenosis rate : QCA (%)	38.2	27.1	14.9††,¤	14.8§§,⊄
Target lesion revascularization rate (%)	13.6	4.8	0	0
Covered strut rate (%)	98.4	99.0	93.7††,¤¤	96.4
Uncovered strut rate (%)	0.17	0.18	3.58††,¤¤	0.99⊄
Malapposed rate (%)	0.82	0	1.73¤¤	1.77⊄ ⊄
Malapposed covered rate (%)	0.46	0	1.1¤	1.73⊄ ⊄
Malapposed uncovered rate (%)	0.36	0	0.63†,¤¤	0.05‡
Tissue coverage thickness (μm)	346.8	267.0	93.4††,¤¤	73.4§§,⊄ ⊄
Neointimal coverage area rate (%)	35.3	28.5	11.5††,¤¤	9.16§§,⊄ ⊄
Evagination/strut rate (%)	0.8	0.02	2.45¤	8.12§§,‡,⊄ ⊄

†p<0.05 (BMS vs. EES); †† p<0.01 (BMS vs. EES); §§ p<0.01 (BMS vs. BES); ¤ p<0.05 (E-ZES vs. EES),¤¤ p<0.01 (E-ZES vs. EES); ⊄ p<0.05 (E-ZES vs. BES); ⊄⊄ p<0.01 (E-ZES vs. BES); ‡ p<0.05 (EES vs. BES).

TCT-557

IVUS Echogenicity Analysis of the Paclitaxel-Eluting Absorbable Magnesium Scaffold (DREAMS)

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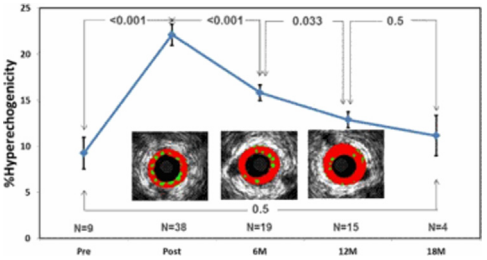
Background: The aim of this study is to explore the application of IVUS derived parameters to act as a surrogate monitoring the absorption and degradation process of a Paclitaxel-Eluting-Absorbable Magnesium Scaffold (DREAMS) implanted in human coronary arteries. The ultrasonic changes of this scaffold are assumed to have a strong relationship towards its degradation and bioresorption process.
Methods: Serial IVUS data of the BIOSOLVE-I study was analysed by applying differential echogenicity analyses, a method which previously showed that visual changes of the ultrasonic appearance of bioresorbable scaffolds can be quantitatively identified.
Results: In post-implantation IVUS images, the struts of the magnesium scaffold appear as clearly visible and quantifiable hyperechogenic spots without, unlike calcified areas, causing any acoustic shadowing. Echogenicity analyses of pre- and post-implantation scaffolded segments showed a significant increase of %hyperechogenicity caused by the scaffold from 9 to 22% (p<0.001); respectively (Figure 1). At 6 months the %hyperechogenicity decreased significantly from 22 to 16% (p<0.001). At further time points the scaffolded segments showed still a continuous further decrease of %hyperechogenicity, however, leveling off to a non-significant change between 12 and 18 months, 13 vs. 12% (p=0.5).



Conclusions: The magnesium scaffold shows a continuous decrease of its ultrasonic appearance over time and the quantitative differential echogenicity evaluation supports that the DREAMS absorption is likely to be completed at 6-months.

TCT-558

Adjunctive Rotational Atherectomy Before Drug-Eluting Stent Deployment is not an Essential Strategy for Severely Calcified Stenosis Identified by Pre-procedural Intravascular Ultrasound: Mid-term Angiographic and Clinical Outcomes.

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Background: Rotational atherectomy (RA) is an effective strategy for the modification of heavily calcified coronary lesions, particularly those which balloon catheters or imaging devices cannot cross. Identification of extended superficial calcium by intravascular ultrasound (IVUS) has led to selected vessel modification with RA to facilitate stent delivery and expansion. We assessed the necessity of lesion preparation with RA for heavily calcified stenoses identified by pre-procedural IVUS in drug-eluting stent (DES) era.
Methods: From January 2010 through October 2012, 143 de novo severely calcified stenoses (defined as calcium arc of >270 degrees as identified by pre-procedural IVUS) in 143 patients were assigned to RA followed by stenting or stenting without RA at the discretion of the operator. Angiographically documented calcified lesions that an IVUS catheter could not cross were excluded. IVUS morphometric analysis was performed. Cardiac death, myocardial infarction, stent thrombosis, target lesion revascularization (TLR) and target vessel revascularization (TVR) were assessed at mid-term.
Results: RA was performed in 51/143 lesions (35.7%). Complete procedural success was achieved in all cases. Second-generation DES was used in 121 cases (84.6%). Patient and lesion characteristics were similar in both populations. Minimal lumen area at post-procedure was larger in RA patients vs. non-RA patients (6.95±2.30mm^2 vs. 6.06±1.86mm^2, p=0.02). No cardiac death and stent thrombosis occurred in either population. There was no difference in myocardial infarction between RA patients and non-RA patients (7.8% vs. 2.2%, p=0.11). RA patients showed a trend of higher TLR and TVR vs. non-RA patients (TLR: 19.6% vs. 9.8%, p=0.097, TVR: 21.6% vs. 9.8%, p=0.052). Multivariable logistic regression analysis showed chronic kidney disease on hemodialysis to be the strongest independent predictor of TLR (OR, 5.86, 95% CI 1.93 -17.80, p=0.002) and TVR (OR, 5.02, 95% CI 1.74-14.47, p=0.003).
Conclusions: In conclusion, DES implantation without RA could be a default strategy for severely calcified lesions, even those with ring calcification, when IVUS assessment is possible at pre-procedure.

TCT-559

Incidence, Predictors, and Three-Year Outcome of Tissue Prolapse After Stent Implantation in ST-Segment Elevation Myocardial Infarction Patients

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Background: Several observational studies have shown that tissue prolapse (TP) lesions detected by intravascular ultrasound after stent implantation in coronary artery diseases are not fatal phenomena. However data are lacking about their characteristics and long term outcomes in patients with ST-segment elevation myocardial infarction (STEMI) undergoing primary percutaneous coronary intervention (PCI).
Methods: From August 1, 2008, to December 31, 2009, one hundred eight patients who underwent primary PCI with IVUS under diagnosis of STEMI were enrolled in this study. Fifty four patients (50.0%) showed TP in IVUS after stent implantation. Clinical characteristics, angiographic and IVUS data were statistically analyzed according to presence of TP. (TP+ vs. TP-) One month, one year, two years, and three years clinical follow up was performed.
Results: In TP + group, EF was lower (47.5±8.0% vs. 52.3±8.8%, p=0.004), peak creatine kinase-myocardial band(CK-MB) level was higher (230.8±219.5 mg/dl vs.

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122.4±178.3 mg/dl, p=0.006), pre-PCI minimal lumen diameter was smaller (0.19±0.30mm vs. 0.32±0.36mm, p=0.041), pre-PCI diameter stenosis was higher (93.9±9.5% vs 89.6±11.5%, p=0.037), pre PCI TIMI flow was lower (pre-PCI TIMI flow non-3; 77.8% vs. 59.3%, p=0.038), and post-PCI diameter stenosis was higher (14.6±5.8% vs. 11.6±5.0%, p=0.004). Multivariate analysis revealed peak CK-MB and EF were independent predictor of TP. During three years of follow up, major adverse cardiac events (MACE; target vessel revascularization, myocardial infarction, death) were not different in TP + and TP – groups (11.1% vs. 16.7%, p=0.404).
Conclusions: Despite of minor angiographic difference, TP was not associated with three-year MACE in patients with primary coronary stent implantation due to STEMI.

TCT-560

Randomized Serial Optical Coherence Tomographic Evaluation of The Lesions Following Biolimus-A9-eluting versus Sirolimus-eluting stents; SEVEN OCT trial

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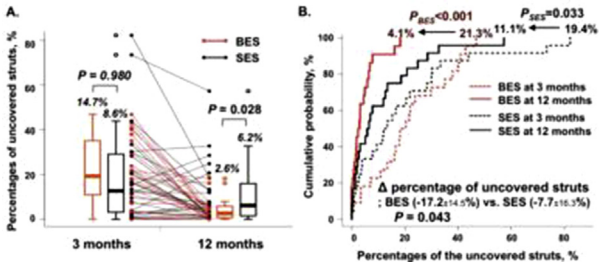
Background: No randomized studies have been conducted to investigate serial changes of optical coherence tomography (OCT) findings following biolimus-A9-eluting stents (BES) vs. sirolimus-eluting stents (SES) implantation.
Methods: A total of 60 patients fulfilling study criteria were randomly assigned into BES (n=30) and SES (n=30) implantation. Of these, serial OCT evaluation at post-procedure, 3, and 12 months was performed in 46 patients [BES (n=22) and SES (n=24)] and OCT findings were compared according to the types of stents and followed time intervals. The primary endpoint was the percentage of uncovered struts (ratio of uncovered struts to total struts in all cross-sections with 0.2-mm interval) at 3 and 12 months and the changes (Δ) of percentages between 3-12 months.
Results: Although the percentages of uncovered struts at 3 months were not significantly different between two stents, BES compared to SES showed a significantly higher percentage of uncovered struts on 12-month OCT without significant difference of neointimal thickness (See Figure A). Through serial OCT evaluation, both stents significantly increased strut coverage from 3 to 12 months. However, BES showed a greater Δ percentage of uncovered struts between 3-12 months than SES (See Figure B).



Conclusions: In this randomized serial OCT study, both DESs still showed the incomplete strut coverage at 3 months but BES compared to SES showed a significantly lower prevalence of uncovered struts at 12 months by superior coverage from 3 to 12 months.

TCT-561

Comparison Of Stent Axial Integrity In First- Versus Second-Generation Drug-Eluting Stents: Insights From An Intravascular Ultrasound Analysis

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Background: Longitudinal stent deformation (LSD) is a recently reported complication of coronary intervention. However, to date, the axial integrity of stents has not been systematically examined. This study aimed to assess the rate of LSD after implantation utilizing intravascular ultrasound (IVUS).
Methods: A total of 218 drug-eluting stents (DES) of 197 patients with coronary artery disease who underwent IVUS after implantation for de novo lesions were included: 32.1% sirolimus-eluting stents (SES); 15.6% paclitaxel-eluting stents (PES); 22.9% cobalt-chromium everolimus-eluting stents (CC-EES); and 29.4% platinum-chromium everolimus-eluting stents (PC-EES, Element platform). Stent length was determined using automatic pullback of an IVUS catheter. The absolute value of the difference in length [IVUS-measured stent length – labeled stent length] (mm), and the absolute value of the relative difference in length [(IVUS-measured stent length – labeled stent length) divided by labeled length] (%) were analyzed.
Results: There was no significant difference with regards to the absolute and relative differences in stent length among groups. The absolute relative difference of >5% was the lowest in the SES group compared to the other groups. Significant (>15%) absolute value of the relative difference in stent length was low and similar among groups. (Table)

IVUS findings					
	Cypher (n=70)	TAXUS (n=34)	Xience/ Promus (n=50)	Promus Element (n=64)	P value
Absolute value of difference in length [IVUS-measured length-labeled length] (mm)	1.0±0.7	1.0±0.7	1.0±0.7	0.9±0.6	0.965
Absolute value of relative change in length [(IVUS-measured length-labeled length)/ labeled length] (%)	4.9±3.8	6.2±4.5	5.7±3.6	6.0±4.7	0.386
Absolute relative difference of >5% (%)	34.3	58.8	54.0	51.6	0.048
Absolute relative difference of >15% (significant difference) (%)	2.9	5.9	4.0	4.7	0.896

Conclusions: This IVUS analysis proved that there are no significant differences in axial stent integrity between first- and second-generation DES and among second-generation DES. The anecdotal reports of longitudinal deformation are unsubstantiated in contemporary clinical practice.

TCT-562

Impact of Target Lesion Coronary Calcification on Stent Expansion: An Optical Coherence Tomography Study

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Background: Stent underexpansion is still a concern as a cause of drug-eluting stent (DES) failure. Although the amount of coronary calcification is considered as a contributing factor for stent under expansion, a previous intravascular ultrasound (IVUS) study failed to demonstrate relation between stent expansion and coronary calcification. Optical coherence tomography (OCT) offers better quantitative assessment of coronary calcium than IVUS and therefore may have potential to predict stent expansion. Thus, the purpose of this study was to investigate whether stent expansion could be predicted by coronary calcification assessed by OCT.
Methods: A total of 51 de novo native coronary artery lesions from 44 patients treated by single 2nd generation DES were enrolled. Prior to stent deployment, arc of calcium and area of calcium at the maximal calcification site within the target lesion were measured using OCT. After successful stent implantation, OCT imaging was repeated

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